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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/631,999	07/30/2003	Viatcheslav V. Osipov	200300477-1	2304
22879	7590 12/29/2005	EXAMINER		INER
HEWLETT PACKARD COMPANY			TOLEDO, FERNANDO L	
P O BOX 272	400, 3404 E. HARMOI	NY ROAD		
INTELLECTUAL PROPERTY ADMINISTRATION			ART UNIT	PAPER NUMBER
FORT COLLI	NS, CO 80527-2400		2823	

DATE MAILED: 12/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

			d			
	Application No.	Applicant(s)	J			
	10/631,999	OSIPOV ET AL.				
Office Action Summary	Examiner	Art Unit				
	Fernando L. Toledo	2823				
The MAILING DATE of this communication	appears on the cover sheet wi	th the correspondence add	ress			
Period for Reply		ONTHO) FROM				
A SHORTENED STATUTORY PERIOD FOR RETHE MAILING DATE OF THIS COMMUNICATION.  Extensions of time may be available under the provisions of 37 CF after SIX (6) MONTHS from the mailing date of this communication. If the period for reply specified above is less than thirty (30) days, or if NO period for reply is specified above, the maximum statutory positive for the period for reply within the set or extended period for reply will, by some any reply received by the Office later than three months after the rearned patent term adjustment. See 37 CFR 1.704(b).	ON.  R 1.136(a). In no event, however, may a r. n. a reply within the statutory minimum of thirl eriod will apply and will expire SIX (6) MON ttatute, cause the application to become AB	eply be timely filed  y (30) days will be considered timely. THS from the mailing date of this contact the contact in the cont				
Status						
1) Responsive to communication(s) filed on 2	21 October 2005.					
2a)⊠ This action is <b>FINAL</b> . 2b)□	☑ This action is FINAL. 2b) ☐ This action is non-final.					
•	Since this application is in condition for allowance except for formal matters, prosecution as to the merits is					
closed in accordance with the practice und	ler <i>Ex par</i> te Quayle, 1935 C.D	. 11, 453 O.G. 213.				
Disposition of Claims						
4) Claim(s) 1-21 is/are pending in the applica	ition.					
4a) Of the above claim(s) is/are with	ndrawn from consideration.					
5) Claim(s) is/are allowed.						
6)⊠ Claim(s) <u>1-21</u> is/are rejected.						
· <u> </u>	_					
8) Claim(s) are subject to restriction a	nu/or election requirement.					
Application Papers						
9)☐ The specification is objected to by the Exar	miner.					
10)⊠ The drawing(s) filed on <u>30 July 2003</u> is/are	)⊠ The drawing(s) filed on <u>30 July 2003</u> is/are: a)⊠ accepted or b)□ objected to by the Examiner.					
	Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).					
Replacement drawing sheet(s) including the co	,	` , ,	` ,			
11)☐ The oath or declaration is objected to by th	e Examiner. Note the attached	of Office Action of form PTC	J-152.			
Priority under 35 U.S.C. § 119						
12)☐ Acknowledgment is made of a claim for for	eign priority under 35 U.S.C. §	119(a)-(d) or (f).				
	a) All b) Some * c) None of:					
1. Certified copies of the priority docum		P 42 <b>A</b>				
<ul> <li>2. Certified copies of the priority documents have been received in Application No</li> <li>3. Copies of the certified copies of the priority documents have been received in this National Stage</li> </ul>						
application from the International Bu	•	received in this Mational C	nage			
* See the attached detailed Office action for a		received.				
Attachment(s)						
1) Notice of References Cited (PTO-892)		Summary (PTO-413)				
<ol> <li>Notice of Draftsperson's Patent Drawing Review (PTO-948</li> <li>Information Disclosure Statement(s) (PTO-1449 or PTO/SE</li> </ol>	<i>'</i>	s)/Mail Date nformal Patent Application (PTO-	·152)			
Paper No(s)/Mail Date	6)  Other:	* * * * * * * * * * * * * * * * * * * *	•			

U.S. Patent and Trademark Office PTOL-326 (Rev. 1-04)

### **DETAILED ACTION**

## Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Sankar Das Sarma (Spintronics).

- 2. In re claim 1, Sankar discloses in the article "Spintronics", pages 516 523 a first magnetic region (emitter); a second magnetic region (collector); a control region (channel) that forms a first interface with the first magnetic region; and a wire (gate) relative to the control region (channel) so that a current through the wire creates in the control region a magnetic field that rotates spins of the electron traversing the control region (Figure 1).
- 3. In re claims 2 and 13, Sankar discloses wherein the control region is such that an electron spin relaxation time of the control region is longer than a transit time of the electrons traversing control region (Figure 3 and column 3, page 518).
- 4. In re claims 3 and 14, Sankar discloses wherein the control region includes a semiconductor material (column 2, page 518).
- 5. In re claims 4 and 15, Sankar discloses wherein the semiconductor material is selected from a group consisting of Si, Ge, GaAs, InAs, GaP, GaInAs, ZnSe and ZnCdSe (column 2, page 518).

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(Figure 5).

7. In re claims 6, 17 and 18, Sankar discloses wherein each of the first and second magnetic

regions includes a ferromagnetic material (column 2, page 518).

8. In re claims 7 and 19, Sankar discloses wherein the first magnetic region has a first

magnetization, the second magnetic region has a second magnetization, and the first and second

magnetizations are fixed at a relative angle selected to give the device a desired electrical

characteristic (column 3, page 518).

9. In re claims 8 and 20, Sankar discloses further including terminals that permit biasing of

the first and second magnetic regions to cause injection of spin-polarized electrons through the

first interface into the control region so that the second interface acts as a spin filter with a

resistance depending on spin orientation of the spin-polarized electrons in the control region,

near the second interface (column 3, page 518).

10. In re claims 9 and 21, Sankar discloses wherein a bias voltage applied between the first

and second magnetic regions causes injection of spin-polarized electrons through the control

region between the first magnetic region and the second magnetic region (column3, page 518).

11. In re claim 10, Sankar discloses wherein a fixed bias voltage is applied between the first

and second magnetic regions, and a first current through the wire changes a second current

between the first and second magnetic regions (column 3, page 518).

12. In re claim 11, Sankar does not disclose further including an insulating material disposed

to electrically insulate the wire (gate) form the control region (channel), the first magnetic region

(emitter) and the second magnetic region (collector). However, it is inherent to insulate the wire

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from the other elements of the device since the absence of an insulating material electrically insulating the gate, would short circuit the device.

13. In re claim 12, Sankar discloses a magnetic wire (gate); a magnetic region (emitter) and a control region (channel) forming a first interface with the magnetic wire and a second interface with the magnetic regions, wherein: the first and second interfaces selectively permit spinpolarized electrons to cross between the magnetic wire and the magnetic region; and a current along the magnetic wire creates in the control region a magnetic field that rotates spins of the electron traversing the control region (columns 2 and 3, page 518).

## Response to Arguments

- 14. Applicant's arguments filed 21 October 2005 have been fully considered but they are not persuasive for the following reasons.
- 15. Applicant contests that Sarma does not teach electron spin interacting with a magnetic field produced by a current through a wire. Examiner respectfully submits that Sarma teaches such limitation in 2<sup>nd</sup> column on page 518.

#### Conclusion

16. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after Application/Control Number: 10/631,999

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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Fernando L. Toledo whose telephone number is 571-272-1867.

The examiner can normally be reached on Mon-Thu 7am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

George Fourson
Primary Examiner

Art Unit 2823

FToledo

26 December 2005